

Amendments to the Specification:

Please replace the paragraph beginning on page 1, line 25 with the following amended paragraph:

JP-A-2000-144056 discloses a surface treating liquid that is a mixture of (a) a first or second silicone compound, (b) an acid, and (c) a solvent containing water dissolved therein. The first silicone compound has a hydrolysable functional group at its end. The second silicone compound has a hydrolysable functional group at one end and a fluorolalkyl fluoroalkyl group at the other end.

Please replace the paragraph beginning on page 2, line 1 with the following amended paragraph:

JP-A-8-12375 discloses a water-repellent article prepared by applying a ~~coating liquid~~ coating solution to a substrate. This ~~coating liquid~~ coating solution is prepared by mixing together (a) a first solution obtained by hydrolyzing in a solvent a fluoroalkyl-group-containing silane compound and another compound (polydimethylsiloxane and/or polydimethylsiloxane derivative) and (b) a second solution obtained by hydrolyzing in a solvent an alkoxysilane compound.

Please replace the paragraph beginning on page 2, line 8 with the following amended paragraph:

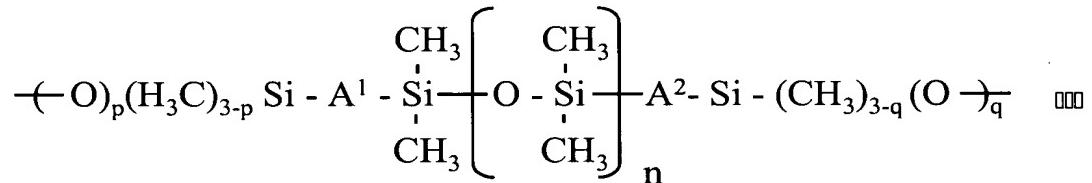
JP-A-2000-26758 discloses a coating composition containing as essential components (A) a ~~hydroxyl-containing~~ hydroxyl-group-containing vinyl polymer,

(B) an epoxy-terminated siloxane polymer, (C) a sulfonic acid compound, (D) a crosslinking agent component, and (E) a surfactant.

Please replace the paragraph beginning on page 2, line 23 with the following amended paragraph:

According to the present invention, there is provided an article superior in making a waterdrop slip down a surface of the article. This article comprises a substrate and a functional film formed on a surface of the substrate. This functional (waterdrop slippage capable) film comprises:

- (a) a silica forming a matrix of the functional film;
- (b) a silylated-terminal dimethyl silicone represented by the general formula [A], the dimetyl dimethyl silicone being in an amount of from 0.1wt% to 10wt%, based on a total weight of the silica; and
- (c) a fluoroalkylsilane represented by the general formula [B],



where each of A¹ and A² is independently a bivalent hydrocarbon group, -(CH₂)_i-NH-COO- group, where i is an integer of from 0 to 9, or oxygen; n is an integer of 2,000 or less and represents an average degree of polymerization; each of p and q is independently an integer of from 0 to 3; a total of p and q is 3 or greater; and each of terminal oxygens is independently bonded to a unit that is different from the dimethyl silicone or to another unit that is identical with the dimethyl silicone,



...

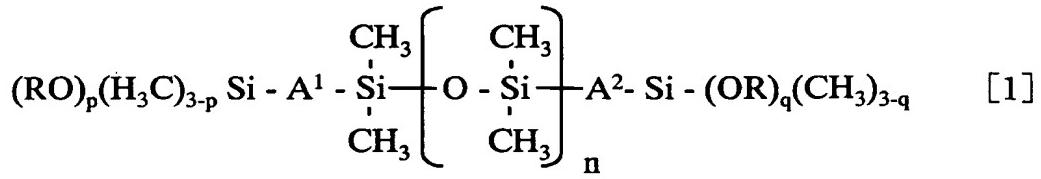
where B represents $-CF_3$ group or $-CH_2CH_2Si(CH_3)_{3-t}(O-)_t$ group, where t is an integer of from 1 to 3; r is an integer of from 0 to 12; s is an integer of from 1 to 3; and a terminal oxygen is bonded to a unit that is different from the fluoroalkylsilane or to another unit that is identical with the fluoroalkylsilane.

Please replace the paragraph beginning on page 3, line 16 with the following amended paragraph:

According to the present invention, there is provided a first process for producing the above article. The first process comprises the steps of:

(a) mixing a silica precursor sol with (i) an alkoxy-group-terminated dimethyl silicone that is represented by the general formula [1] and that is in an amount of from 0.1wt% to 10wt%, based on a total weight of a silica that is to be produced from the silica precursor sol and (ii) a fluoroalkylsilane represented by the general formula [2], such that the alkoxy-group-terminated dimethyl silicone and the fluoroalkylsilane are subjected to hydrolysis and polycondensation to form a polycondensation product and such that a ~~coating liquid coating solution~~ containing a mixture of the silica precursor sol and the polycondensation product is prepared; and

(b) applying the ~~coating liquid coating solution~~ to a substrate ,



where each of A^1 and A^2 is independently a bivalent hydrocarbon group, $-(CH_2)_i-NH-COO-$ group, where i is an integer of from 0 to 9, or oxygen; R is a monovalent hydrocarbon group; n is an integer of 2,000 or less and represents an average degree of polymerization; each of p and q is independently an integer of from 0 to 3; and a total of p and q is 3 or greater,



where B represents $-CF_3$ group or $-CH_2CH_2Si(CH_3)_{3-t}Y_t$ group, where Y represents a hydrolysable group and t is an integer of from 1 to 3; X represents a hydrolysable group; r is an integer of from 0 to 12; and s is an integer of from 1 to 3.

Please replace the paragraph beginning on page 4, line 13 with the following amended paragraph:

According to the present invention, there is provided a second process for producing the article. The second process comprises the steps of:

- (a) subjecting an alkoxy silane to hydrolysis and polycondensation, thereby preparing a silica precursor sol;
- (b) subjecting an alkoxy-group-terminated dimethyl silicone represented by the general formula [1] and a fluoroalkylsilane represented by the general

formula [2] to hydrolysis and polycondensation, thereby preparing a polycondensation product;

- (c) mixing the silica precursor sol with the polycondensation product, thereby preparing a ~~coating liquid~~ coating solution; and
- (d) applying the ~~coating liquid~~ coating solution to a substrate.

Please replace the paragraph beginning on page 4, line 25 with the following amended paragraph:

Figure is a graph showing the contact angle changes of a waterdrop in the wiper wear test of Example 1-12 and Comparative Example 1-3.

Please replace the paragraph beginning on page 5, line 20 with the following amended paragraph:

The silylated-terminal dimethyl silicone represented by the general formula [A] of the functional film is derived from an alkoxy-group-terminated dimethyl silicone (represented by the general formula [1]) used in the first or second process. The fluoroalkylsilane represented by the general formula [B] of the functional film is derived from a fluoroalkylsilane (represented by the general formula [2]) used in the first or second process.

Please replace the paragraph beginning on page 9, line 3 with the following amended paragraph:

In the functional film of the present invention, it is preferable that the fluoroalkylsilane represented by the general formula [B] is present in an amount

of 20-200 moles relative to one mole of the silylated-terminal dimethyl silicone represented by the general formula [A]. Furthermore, in the first or second process, it is preferable that the fluoroalkylsilane represented by the general formula [2] is made to be present in an amount of 20-200 moles relative to one mole of the alkoxy-group-terminated dimethyl silicone. If it is less than 20 moles, the content of the fluoroalkylsilane is low relative to the alkoxy-group-terminated dimethyl silicone. Therefore, a durable film may not be obtained. Although it is possible to prevent the occurrence of judder upon the wiper sliding movement, the film exfoliation may occur by wiping with a wiper. If it exceeds 200 moles, the content of the fluoroalkylsilane becomes high relative to the alkoxy-group-terminated dimethyl silicone. With this, the waterdrop slippage capability may become inferior, and there may occur a malfunction in which judder occurs upon the wiper sliding movement.

Please replace the paragraph beginning on page 11, line 5 with the following amended paragraph:

In the first or second process, hydrolysis and polycondensation occur at the alkoxy group site of the alkoxy-group-terminated dimethyl silicone and at the hydrolysable group site of the fluoroalkylsilane. Therefore, when the functional film is formed, the silylated-terminal dimethyl silicone (represented by the general formula [A]) and the fluoroalkylsilane (represented by the general formula [B]) are chemically bonded with the silica as the matrix, thereby obtaining a film superior in durability. Upon this, it may be possible that an alkoxy group site and a hydrolysable group site, which are not chemically bonded

with the silica matrix, are reacted with and bonded with an alkoxy group site of another alkoxy-group-terminated dimethyl silicone and a hydrolysable group site of a fluoroalkylsilane. The above dimethyl silicone and the above fluoroalkylsilane may be bonded with the silica matrix through another dimethyl silicone and another fluoroalkylsilane.

Please replace the paragraph beginning on page 13, line 19 with the following amended paragraph:

Then, a heat treatment is conducted, thereby allowing a polycondensation of the silica sol and the alkoxy-group-terminated dimethyl silicone and the fluoroalkylsilane to proceed and thereby bonding the silylated-terminal dimethyl silicone and the fluoroalkylsilane and the silica matrix together and at the same time fixedly bonding the functional film to the substrate surface. As the heat treatment temperature, 80°C to 600°C is preferable. If the heat treatment temperature is less than 80°C, not only the above polycondensation becomes insufficient, but also the functional film is not sufficiently bonded to the substrate. As a result, durability lowers, and it is not preferable. On the other hand, if it exceeds 600°C, the dimethyl silicone and the fluoroalkyl silane are pyrolyzed, thereby significantly lowering waterdrop slippage capability. Therefore, it is not preferable.

Please replace the paragraph beginning on page 14, line 19 with the following amended paragraph:

As shown in the following Examples 1-1 to 1-13 and 3-1 and 3-5, the functional film of the present invention is provided with high waterdrop slippage capability and durability, particularly mud water abrasion resistance and wear resistance by wipers and the like. Therefore, in case that it is used for vehicular window glass and the like, forward, sideward and rearward visions are easily secured, thereby improving driving safety. Furthermore, significant advantageous effects are achieved such as this effect being maintained for a long time. Furthermore, as shown in the following Examples 2-1 to 2-13, a highly durable, functional film of the present invention is superior in high water repellency, waterdrop slippage capability, and wear resistance by wipers and the like. In addition, it prevents the occurrence of judder upon the wiper sliding movement. Therefore, in case that it is used for a vehicular windshield glass, it becomes easy to obtain a forward visibility under a rainy weather, and the driving safety is improved without worry about wiper judder. Furthermore, it is possible to achieve remarkable advantageous effects such as that this effect can be maintained for a long time.

Please replace the paragraph beginning on page 17, line 17 with the following amended paragraph:

The coating solution prepared by the above (2) was applied by a spin coating onto the glass substrate prepared by the above (3). Firstly, the above glass substrate was placed on a spin coating machine. While it was rotated at a rotation speed of 80rpm, the coating solution of about 200ml was dropped. The rotation speed was maintained for 30 seconds to dry the coated film, thereby

obtaining a transparent gel film of a good ~~film forming property quality~~. Then, a heating treatment was conducted at 280 $^{\circ}$ C for 10min, followed by cooling down to room temperature, thereby obtaining a glass sample (a highly water drop slippage capable article) with a functional film having a film thickness of 20nm.

Please replace the paragraph beginning on page 26, line 9 with the following amended paragraph:

(4) Highly Durable Functional Film Formation

Please replace the paragraph beginning on page 26, line 28 with the following amended paragraph:

While the film surface of the substrate formed with the ~~highly durable~~, functional film was sprinkled with water under a repeating condition of a sprinkling of tap water for 45 seconds with a sprinkling amount of 700ml/min and a cessation for 15 seconds, a wiper blade, to which a natural rubber based, water repellent rubber in contact with a pressing pressure of 16g/cm had been attached, was operated using a wiper driving system of an actual car. Upon this, the inclination angle of the above substrate was about 30°. As the wiper rubber, a water repellent wiper rubber (type: 1UT7-67-33H) made by Mazda Motor Corporation was used. Upon this, when the wiper blade was reciprocated one time, it was counted as one time of wiping number. The wiper blade was operated with a wiping speed of 48 times per minute.